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H01L 27/146 (2006.01)(72) Inventors: **Ossi M. Kalevo**, Toijala (FI); **Samu T. Koskinen**, Tampere (FI); **Tero Rissa**, Siivikkala (FI)(52) **U.S. Cl.**
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USPC **250/208.1**(73) Assignee: **Nokia Corporation**(57) **ABSTRACT**(21) Appl. No.: **14/328,851**(22) Filed: **Jul. 11, 2014****Related U.S. Application Data**

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An apparatus includes a three dimensional array of light receptors disposed within a substrate having a light receiving surface, where light receptors disposed closer to the light receiving surface are responsive to light having shorter wavelengths than light receptors disposed further from the light receiving surface, and where each light receptor is configured to output a binary value and to change state between an off-state and an on-state by the absorption of at least one photon.

